CLAIMS

What is claimed is:

1. A method, comprising:

determining, based on first equalizer coefficients corresponding to a first portion of a digital signal received during a first time period, and second equalizer coefficients corresponding to a second portion of the digital signal received during a second time period, a timing-error estimate; and

providing the timing-error estimate to a timing-correction value unit, wherein the timing-correction value unit generates, based, at least in part, on the timing-error estimate, a timing-correction value used to correct timing error for a third portion of the digital signal received during a third time period.

2. The method of claim 1, wherein determining, based on the first equalizer coefficients and the second equalizer coefficients, the parabolic timing-error estimate comprises:

calculating, based on the first equalizer coefficients a position of a maximum point of a first parabolic function;

calculating, based on the second equalizer coefficients, a position of a maximum point of a second parabolic function; and

determining a difference between the maximum point of the first parabolic function and the maximum point of the second parabolic function.

3. The method of claim 2, wherein calculating, based on equalizer coefficients, a position of a maximum point of a parabolic function comprises:

receiving equalizer coefficients;

identifying a value of an equalizer coefficient having a largest value among the equalizer coefficients, wherein the equalizer coefficient having the largest value comprises a main equalizer coefficient;

identifying a previous-adjacent coefficient value corresponding to an equalizer coefficient immediately preceding the main equalizer coefficient;

identifying a subsequent-adjacent coefficient value corresponding to an equalizer coefficient immediately following the main equalizer coefficient; and

calculating, based on the main equalizer coefficient value, the previous-adjacent coefficient value and the subsequent-adjacent coefficient value, the maximum point of the parabolic function.

4. The method of claim 3, wherein calculating, based on the main equalizer coefficient value, the previous-adjacent coefficient value and the subsequent-adjacent coefficient value, the maximum point of the parabolic function comprises calculating the maximum point of the parabolic function according to the formula $p = d\,(y_- - y_+) / (y_+ - 2\,y_0 + y_-) / 2$, where p comprises the maximum point of the parabolic function, d comprises a time between equalizer coefficients, y_+ comprises the subsequent-adjacent equalizer coefficient value, y_- comprises the previous-adjacent equalizer coefficient value, and y_0 comprises the main equalizer coefficient value.

5. The method of claim 1, wherein the timing-correction value unit comprises a phase lock loop.

6. An apparatus, comprising:

an equalizer coefficient comparison unit, to receive equalizer coefficients for a first portion of a digital signal and a second portion of the digital signal, determine, for the first portion and the second portion, an equalizer coefficient having a largest value among the equalizer coefficients, wherein the equalizer coefficient having the largest value comprises a main equalizer coefficient, identify a previous-adjacent coefficient value corresponding to an equalizer coefficient immediately preceding the main equalizer coefficient and identify a subsequent-adjacent coefficient value corresponding to an equalizer coefficient immediately following the main equalizer coefficient;

a parabolic function maximum position unit, to calculate, for the first portion of the digital signal and the second portion of the digital signal, a position of a maximum point of a parabolic function, based on the main coefficient value, the previous-adjacent coefficient value and the subsequent-adjacent coefficient value; and

a maximum position difference unit, to determine a difference between the maximum point of the parabolic function for the first portion of the digital signal and the maximum point of the parabolic function for the second portion of the digital signal, wherein the difference comprises a parabolic timing-error estimate.

7. The apparatus of claim 6, further comprising an equalizer, to provide the equalizer coefficients for the first portion of the digital signal and the equalizer coefficients for the second portion of the digital signal.

8. The apparatus of claim 7, wherein the equalizer comprises an adaptive equalizer.

9. The apparatus of claim 8, wherein the parabolic function maximum position unit calculates the position of the maximum value according to the equation $p = d\,(y_{-} - y_{+}) / (y_{+} - 2\,y_0 + y_{-}) / 2$, where y_0 is the magnitude of the largest coefficient value, y_{+} is the magnitude of the previous-adjacent coefficient value, $y\_$ is the magnitude of the subsequent-adjacent coefficient value, and d is a receiver sampling rate.

10. The apparatus of claim 9, further comprising a timing-correction value unit, to receive the parabolic timing-error estimate and generate a timing-correction value based, at least in part, on the parabolic timing-error value.

11. The apparatus of claim 10, further comprising an interpolator, to receive the timing-correction value from the timing-correction value unit, and time shift a third portion of the digital signal based on the timing-correction value.

12. The apparatus of claim 11, further comprising a timing-error estimator unit, to generate a timing-error estimate based on an output of the equalizer.

13. The apparatus of claim 12, further comprising a comparator, to combine the timing-error estimate with the parabolic timing-error estimate to generate the timing-correction value.

14. The apparatus of claim 10, wherein the timing-correction value unit comprises a phase lock loop.

15. An article of manufacture comprising:

a machine-accessible medium including thereon sequences of instructions that, when executed, cause an electronic system to:

determine, based on first equalizer coefficients corresponding to a first portion of a digital signal received during a first time period, and second equalizer coefficients corresponding to a second portion of the digital signal received during a second time period, a timing-error estimate; and

provide the timing-error estimate to a timing-correction value unit, wherein the timing-correction value unit generates, based, at least in part, on the timing-error estimate, a timing-correction value used to correct timing error for a third portion of the digital signal received during a third time period.

16. The article of manufacture of claim 15, wherein the sequences of instructions that, when executed, cause the electronic system to determine, based on the

first equalizer coefficients and the second equalizer coefficients, the parabolic timing-error estimate comprise sequences of instructions that, when executed, cause the electronic system to:

calculate, based on the first equalizer coefficients a position of a maximum point of a first parabolic function;

calculate, based on the second equalizer coefficients, a position of a maximum point of a second parabolic function; and

determine a difference between the maximum point of the first parabolic function and the maximum point of the second parabolic function.

17. The article of manufacture of claim 16, wherein the sequences of instructions that, when executed, cause the electronic system to calculate, based on equalizer coefficients, a position of a maximum point of a parabolic function comprise sequences of instructions that, when executed, cause the electronic system to:

receive equalizer coefficients;

identify a value of an equalizer coefficient having a largest value among the equalizer coefficients, wherein the equalizer coefficient having the largest value comprises a main equalizer coefficient;

identify a previous-adjacent coefficient value corresponding to an equalizer coefficient immediately preceding the main equalizer coefficient;

identify a subsequent-adjacent coefficient value corresponding to an equalizer coefficient immediately following the main equalizer coefficient; and

calculate, based on the main equalizer coefficient value, the previous-adjacent coefficient value and the subsequent-adjacent coefficient value, the maximum point of the parabolic function.

18. The article of manufacture of claim 17, wherein the sequences of instructions that, when executed, cause the electronic system to calculate, based on the main equalizer coefficient value, the previous-adjacent coefficient value and the subsequent-adjacent coefficient value, the maximum point of the parabolic function comprise sequences of instructions that, when executed, cause the electronic system to calculate the maximum point of the parabolic function according to the formula $p = d\,(y_- - y_+) / (y_+ - 2\,y_0 + y_-) / 2$, where p comprises the maximum point of the parabolic function, d comprises a time between equalizer coefficients, y_+ comprises the subsequent-adjacent equalizer coefficient value, y_- comprises the previous-adjacent equalizer coefficient value, and y_0 comprises the main equalizer coefficient value.

19. The article of manufacture of claim 15, wherein the sequences of instructions that, when executed, cause the electronic system to provide the parabolic timing-error estimate to the timing-correction value unit comprise sequences of instructions that, when executed, cause the electronic system to provide the parabolic timing-error estimate to a phase lock loop.

20. A system, comprising:

a processor;

a network interface coupled with the processor; and

an article of manufacture comprising a machine-accessible medium including thereon sequences of instructions that, when executed, cause an electronic system to:

determine, based on first equalizer coefficients corresponding to a first portion of a digital signal received during a first time period, and second equalizer coefficients corresponding to a second portion of the digital signal received during a second time period, a parabolic timing-error estimate; and

provide the parabolic timing-error estimate to a timing-correction value unit, wherein the timing-correction value unit generates, based, at least in part, on the parabolic timing-error estimate, a timing-correction value used to correct timing error for a third portion of the digital signal received during a third time period.

21. The system of claim 20, wherein the sequences of instructions that, when executed, cause the electronic system to determine, based on the first equalizer coefficients and the second equalizer coefficients, the parabolic timing-error estimate comprise sequences of instructions that, when executed, cause the electronic system to:

calculate, based on the first equalizer coefficients a position of a maximum point of a first parabolic function;

calculate, based on the second equalizer coefficients, a position of a maximum point of a second parabolic function; and

determine a difference between the maximum point of the first parabolic function and the maximum point of the second parabolic function.

22. The system of claim 21, wherein the sequences of instructions that, when executed, cause the electronic system to calculate, based on equalizer coefficients, a position of a maximum point of a parabolic function comprise sequences of instructions that, when executed, cause the electronic system to:

receive equalizer coefficients;

identify a value of an equalizer coefficient having a largest value among the equalizer coefficients, wherein the equalizer coefficient having the largest value comprises a main equalizer coefficient;

identify a previous-adjacent coefficient value corresponding to an equalizer coefficient immediately preceding the main equalizer coefficient;

identify a subsequent-adjacent coefficient value corresponding to an equalizer coefficient immediately following the main equalizer coefficient; and

calculate, based on the main equalizer coefficient value, the previous-adjacent coefficient value and the subsequent-adjacent coefficient value, the maximum point of the parabolic function.

23. The system of claim 22, wherein the sequences of instructions that, when executed, cause the electronic system to calculate, based on the main equalizer coefficient value, the previous-adjacent coefficient value and the subsequent-adjacent coefficient value, the maximum point of the parabolic function comprise sequences of instructions that, when executed, cause the electronic system to calculate the maximum point of the parabolic function according to the formula $p = d\,(y_- - y_+) / (y_+ - 2\,y_0 + y_-) / 2$, where p comprises the maximum point of the parabolic function, d comprises a time between

equalizer coefficients, y_+ comprises the subsequent-adjacent equalizer coefficient value, y_- comprises the previous-adjacent equalizer coefficient value, and y_0 comprises the main equalizer coefficient value.

24. The system of claim 23, wherein the sequences of instructions that, when executed, cause the electronic system to provide the parabolic timing-error estimate to the timing-correction value unit comprise sequences of instructions that, when executed, cause the electronic system to provide the parabolic timing-error estimate to a phase lock loop.